TRAFFIC ENGINEERING DIVISION

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

Policy/Procedure Guideline

SECTION 3: Traffic and Safety Studies

SUBJECT 3.5: Left Turn Signal Phasing Study

EFFECTIVE DATE: June 13, 1994

PARAGRAPH:

1. PURPOSE:

To establish a uniform practice of evaluating the need for left-turn signal phasing.

2. DEFINITIONS:

The need for a left-turn signal is performed once a request is made in writing to the Traffic Engineering Division. The source may be a citizen, an elected official, a County employee or other Transportation official. There is no "automatic" periodic review system in place to check all signals for possible left-turn arrow needs.

A left-turn arrow should be considered for installation when any one of the following criteria are met:

a. ***Delay*** -

Consider left-turn phasing at an intersection when delay to 3 or more left-turn vehicles is greater than two or more cycles during the observed peak hour.

b. ***Accident Experience Justification*** -

Consider left-turn phasing at an intersection when one or more of the following critical numbers of left-turn accidents have occurred.

One Approach:	Four (4) left turn accidents during a 12 month period, or Six (6) during a 24 month period
Both Approaches:	Six (6) left turn accidents during a 12 month period, or Ten (10) during a 24 month period

c. ***Volume Justification*** -

Consider left-turn phasing at an intersection when the product of left-turning and opposing (through plus right turns) volumes during the peak hour exceeds 100,000 on a four-lane (or six lane) street or 50,000 on a two-lane street.

d. **"LEFT ON GREEN ARROW ONLY" Regulation**

1. Past Experience with this regulation on single left-turn lanes caused confusion in drivers; therefore it was discontinued.

2. Where dual left-turn lanes are present this regulation will be used. A Type "R" three section signal head will be used. This signal head has three arrows a red ,yellow, and green, respectively.

3. This regulation will be considered at single left-turn lanes that continue to exhibit a high left-turn accident history after all other actions have proved unsuccessful.

3. DESCRIPTION:

The procedures for a Left Turn Signal Phasing Study

a. Data Collection

1. If the volume warrant on file for the existing Traffic Signal is not adequate (ie; old count or environment affecting traffic patterns have changed) a request is submitted to the Administrative Support Coordinator to have the Traffic Counts section redo the volume warrant. This data is used to establish the peak hours.

2. A request is submitted to the Administrative Support Coordinator to have the Accident Records section research the accident history of the intersection for the last two years.

3. Observe the intersection during the peak hours. Using the Jamar™ lap top counters literally count all traffic for each turning movement including through movements (this activity typically involves two people). Watch for long queues for the left turn movements under evaluation. Record any ***Delay*** as defined in PARAGRAPH 2 (Definitions).

b. Data Analysis

1. ***Accident Experience Justification:*** Review Accident History for last two years, check if criteria for a left turn signal is met as defined in PARAGRAPH 2 (Definitions).

2. ***Volume Justification:*** Check if criteria for a left turn signal is met as defined in PARAGRAPH 2 (Definitions).

3. ***Traffic Delay Justification:*** Check if criteria for a left turn signal is met as defined in PARAGRAPH 2 (Definitions).

4. Consider any unusual circumstances related to the intersection environment and the typical driving habits

of the drivers in the area under study.

c. Study preparation

1. Using format created on Wordperfect™ fill in all information requested in Left Turn Phase Study.

2. Formulate conclusions and recommendations on the last page of the study. The recommendation should primarily be based on the three main criteria, (ie; ***Accident Experience Justification***, ***Volume Justification***, and ***Traffic Delay Justification)*** any of these alone may suggest a need for a left turn arrow. Any other important information related to your conclusion should be incorporated in your conclusions section of the study.

3. Submit completed Left Turn Phase Study to the County Traffic Engineer for approval of recommendation

4. EXHIBITS:

Left Turn Signal Phasing Study (eight sheets)

5. BACKGROUND:

There are no nationally established warrants for left turn phasing mandated by the Manual of Uniform Traffic Control Devices (MUTCD). The guidelines used by the Maricopa County Department of Transportation are based on numerical values related to accidents, volume, delay, or a combination thereof (described in references used in Section 7).

6. AUTHORIZATION:

1989 Transportation Laws of Arizona, Section 28-643. Local traffic-control devices, Page 165.

28-643. Local Traffic-control devices.
Local authorities in their respective jurisdictions shall place and maintain such traffic-control devices upon highways under their jurisdiction as they deem necessary to indicate and to carry out the provisions of this chapter or local traffic ordinances or to regulate,

warn or guide traffic. All traffic-control devices erected shall conform to the state manual and specifications.

7. REFERENCES:

a. The Manual of Traffic Signal Design (ITE)
b. The Traffic Engineering Handbook (ITE)
c. The Traffic Control Devices Handbook (FHA)

8. ATTACHMENTS:

EXCERPTS from:

The Manual of Traffic Signal Design
The Institute of Transportation Engineers, 2nd Ed., Chap.4, Pg 32-33

Traffic Control Devices Handbook
The Federal Highway Administration, 1983
section 4-18

Approved: _____

Albert G. Letzkus, P.E.
County Traffic Engineer